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(54) Reduction threading dislocations by amorphization and recrystallization

(57) A method for providing an epitaxial layer[14] of a first material over a substrate[11] comprising a second material having a lattice constant different from that of the first material. In the method of the present invention, a first layer of the first material is grown on the substrate[11]. A portion of the first layer is treated to render that portion amorphous. The amorphous portion is then annealed at a temperature above the recrystallization point of the amorphous portion, but below the melting point of the crystallized portion of the first layer thereby recrystallizing the amorphous portion of the first layer. The first layer may be rendered amorphous by ion implantation. The method may be used to generate GaN layers on sapphire having fewer dislocations than GaN layers generated by conventional deposition techniques.

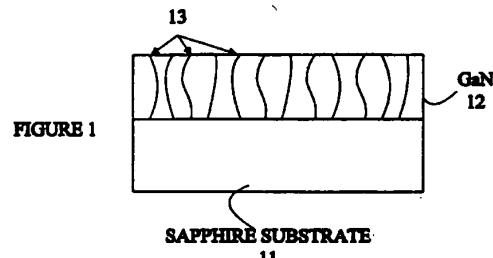


FIGURE 1



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EUROPEAN SEARCH REPORT

Application Number

EP 97 12 0023

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)						
X	PATENT ABSTRACTS OF JAPAN vol. 096, no. 012, 26 December 1996 -& JP 08 222812 A (MATSUSHITA ELECTRIC IND CO LTD), 30 August 1996 * abstract *	1,2,4,5, 8	H01L21/20						
X	US 4 863 877 A (FAN JOHN C C ET AL) 5 September 1989 * claims 1-6; figure 1 *	1-3							
A	ANONYMOUS: "Method To Change Resistivity Type Of Semiconductors. May 1979." IBM TECHNICAL DISCLOSURE BULLETIN, vol. 21, no. 12, May 1979, page 5041 XP002078508 New York, US * the whole document *								
A	DATABASE INSPEC INSTITUTE OF ELECTRICAL ENGINEERS, STEVENAGE, GB Inspec No. 5765640, TAN H H ET AL: "Ion implantation processing of GaN epitaxial layers" XP002078509 * abstract * & PROCEEDINGS OF THE FIRST SYMPOSIUM ON III-V NITRIDE MATERIALS AND PROCESSES, PROCEEDINGS OF III-V NITRIDE MATERIALS AND PROCESSES. (ISBN 1 56677 163 3), LOS ANGELES, CA, USA, 6-8 MAY 1996, pages 142-148, 1996, Pennington, NJ, USA, Electrochem. Soc, USA	1,2,4,5, 7	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01L						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>23 September 1998</td> <td>Köpf, C</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	23 September 1998	Köpf, C
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THE HAGUE	23 September 1998	Köpf, C							
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